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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/817,821	03/26/2001	Keith Hall	SMX 3071.1 (99-22R1)	7846
321	7590	08/27/2004	EXAMINER	
SENNIGER POWERS LEAVITT AND ROEDEL ONE METROPOLITAN SQUARE 16TH FLOOR ST LOUIS, MO 63102			TRAN, MY CHAU T	
			ART UNIT	PAPER NUMBER
			1639	

DATE MAILED: 08/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/817,821

Applicant(s)

HALL ET AL.

Examiner

MY-CHAU T TRAN

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 May 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-10, 14-71 and 90-122 is/are pending in the application.

4a) Of the above claim(s) 7, 8, 20, 23-39, 42-46, 50, 51, 53, 59-68, 96, 97, 104, 105, 108-112, 115, 120 and 121 is/are withdrawn from consideration.

- 5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) 1-6, 9, 10, 14-19, 21, 22, 40, 41, 47-49, 52, 54-58, 69-71, 90-95, 98-103, 106, 107, 113-114, 116-119 and 122 is/are rejected.

- 7) ☐ Claim(s) _____ is/are objected to.

- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.

- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

- a) ☐ All b) ☐ Some * c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. _____.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)

- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.

- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.

- 5) ☐ Notice of Informal Patent Application (PTO-152)

- 6) ☐ Other: _____.

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DETAILED ACTION

Status of Claims

1. Applicant's amendment filed 1/14/04 is acknowledged and entered. Claim 11-13, and 72 has been canceled. Claims 1, 4-5, 9, 14-15, 47, 56, 57 have been amended. Claims 90-122 have been added. Additionally, in the claim listing it is noted that the withdrawn claims were improperly designated as "original" when they should be designated as "withdrawn".
2. Claims 73-89 are canceled by the amendment filed on 1/31/03.
3. Claims 1-71, and 90-122 are pending.
4. This application claims priority to a provisional application 60/191,933 filed 3/24/2000.

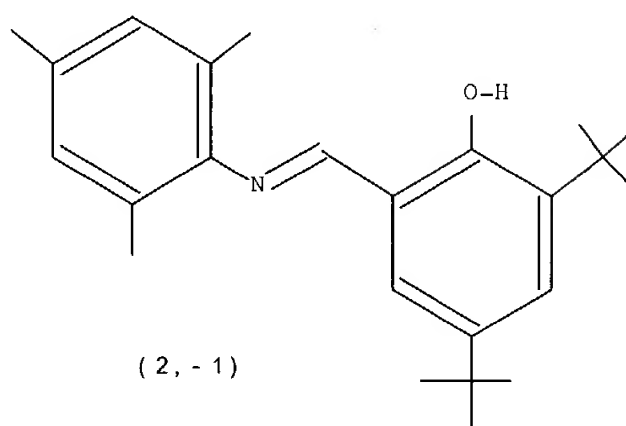
Election/Restrictions

5. Upon further reconsideration, the election of species requirement, mailed 4/21/04, has been withdrawn.
6. Applicant has elected the following species for the elected invention (Claims 1-72, and new Claims 90-122):
 - a. Species 1 (Type of soluble metal precursor): Formula $MR_n = Hf(CH_2Ph)_4$
 - b. Species 2 (Type of coordination number for metal-binding ligand): 2

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c. Species 3 (Type of Charge for metal-binding ligand): -1

d. Species 4 (Type of metal-binding ligand):



e. Species 5 (Type of activator): $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$

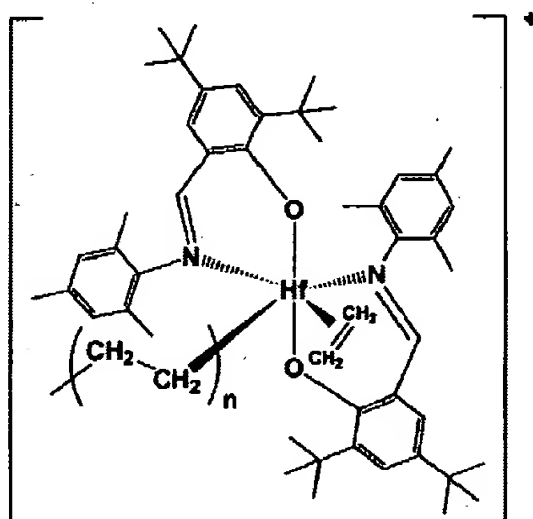
f. Species 6 (Type of property of interest to be screened): Chemical property

g. Species 7 (Type of screening method): Gravimetric measurement of the product yield

h. Species 8 (Number of Ligands in the array): 8

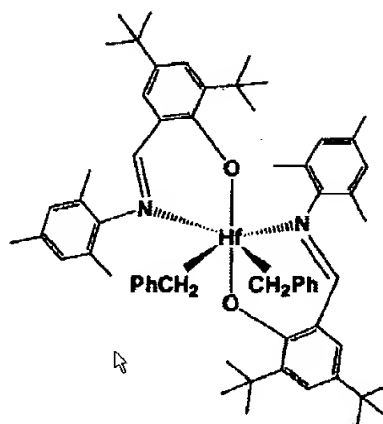
i. Species 9 (Type of deprotonating agent): BuLi

j. The species of polymerization product:



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, wherein the species of polymerization monomer is polyethylene homopolymer and the



species a meta-ligand composition is

7. Claims 7-8, 20, 23-39, 42-46, 50-51, 53, 59-68, 96-97, 104-105, 108-112, and 120-121 are withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected species, there being no allowable generic or linking claim. Election was made **without** traverse in Paper filed on 1/31/03 and 5/18/03.
8. Claims 1-6, 9-10, 14-19, 21-22, 40-41, 47-49, 52, 54-58, 69-71, 90-95, 98-103, 106-107, 113-114, 116-119, and 122 are treated on the merit in this Office Action.

New Rejections – Necessitated by Amendment

Claim Rejections - 35 USC § 112

9. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it

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pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

10. Claims 1-6, 9-10, 14-19, 21-22, 40-41, 47-49, 52, 54-58, and 69-71 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a new matter rejection.

The instant claim 1 briefly recites a process for preparing and screening an array of metal-ligand compositions. The method comprises the steps of 1) preparing an array of metal-ligand compositions by reacting a metal-binding ligand and a dissolved soluble metal precursor to form the metal-ligand composition; 2) preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions; 3) subjecting the array of polymerization mixtures to conditions conducive to the formation of a polymerization reaction product; and 4) screening the array for a polymerization reaction product. The process occurs in a plurality of discrete reaction vessels contained by or within an integrated structure, and the plurality of reaction vessels of the array contains different metal-ligand compositions. The soluble metal precursor comprises a solublizing ligand and one or more metal-ligand compositions are formed without displacing the solublizing ligand.

The recitation of 'preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure' claimed in claim 1, have no clear support in the specification and the

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claims as originally filed. The specification in page 5 disclosed a method of preparing an array of metal-ligand compositions (lines 16-24; also see pg. 39, line 31 to pg. 40, line 5) and screening the metal-ligand compositions for reactivity (see specification: pg. 5, line 25-26; pg. 41, line 28 to pg. 42, line 2) is not support for 'preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure'. Because the specification recites the method of making and screening an array of metal-ligand compositions, it does not support the limitation of the claim 1, which recites a method of making an array of polymerization mixture. Therefore, the scope of the invention as originally disclosed in the specification would not encompass the scope of the limitation of *"preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure"*.

If applicants disagree, applicant should present a detailed analysis as to why the claimed subject matter has clear support in the specification.

11. Claims 90-95, 98-103, 106-107, 113-114, 116-119, and 122 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. This is a new matter rejection.

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The instant claim 90 briefly recites a process for preparing and screening an array of metal-ligand compositions. The method comprises the steps of 1) preparing an array of metal-ligand compositions by reacting a metal-binding ligand and a dissolved soluble metal precursor to form the metal-ligand composition; 2) preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions; 3) subjecting the array of polymerization mixtures to conditions conducive to the formation of a polymerization reaction product; and 4) screening the array for a polymerization reaction product. The process occurs in a plurality of discrete reaction vessels contained by or within an integrated structure, and the plurality of reaction vessels of the array contains different metal-ligand compositions. The soluble metal precursor comprises a solublizing ligand. The formation of one or more metal-ligand compositions is accompanied by the displacement the solublizing ligand, wherein the displaced solublizing ligands are converted to a form that does not significantly inhibit the polymerization reaction prior to the subjecting step.

The recitation of 'preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure' claimed in claim 1, have no clear support in the specification and the claims as originally filed. The specification in page 5 disclosed a method of preparing an array of metal-ligand compositions (lines 16-24; also see pg. 39, line 31 to pg. 40, line 5) and screening the metal-ligand compositions for reactivity (see specification: pg. 5, line 25-26; pg. 41, line 28 to pg. 42, line 2) is not support for 'preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of

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reaction vessels of the integrated structure'. Because the specification recites the method of making and screening an array of metal-ligand compositions, it does not support the limitation of the claim 1, which recites a method of making an array of polymerization mixture. Therefore, the scope of the invention as originally disclosed in the specification would not encompass the scope of the limitation of "*preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure*".

If applicants disagree, applicant should present a detailed analysis as to why the claimed subject matter has clear support in the specification.

12. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

13. Claims 1-6, 9-10, 14-19, 21-22, 40-41, 47-49, 52, 54-58, 69-71, 90-95, 98-103, 106-107, 113-114, 116-119, and 122 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a) Claims 1 and 90 recite the method step of "*preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure*". However, it is unclear as to the correlation of making an array of polymerization mixture and the claimed method of making and

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screening an array of metal-ligand compositions as claimed in claims 1 and 90. Thus the method step of “*preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions in the plurality of reaction vessels of the integrated structure*” is vague and indefinite. It is suggested that applicant amend this method step to delivering a polymerization monomer to the metal-ligand compositions to form a polymerization mixture.

b) Claims 1 and 90 recite the method steps of “*subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and screening the said array for a polymerization reaction product*”.

However, it is unclear as to the correlation of these steps and the claimed method of making and screening an array of metal-ligand compositions as claimed in claims 1 and 90. Thus the method steps of “*subjecting the array of polymerization mixtures in the integrated structure to conditions conducive to the formation of a polymerization reaction product; and screening the said array for a polymerization reaction product*” are vague and indefinite.

c) The term “reactant” of claims 14-15 is vague and indefinite because it is unclear if it is referring to the monomer of the method step of preparing an array of polymerization mixture or an additional reactant of claim 1.

d) The phrase “displaced ligands” of claim 90 is vague because it is unclear as to which ligand it is referring to, i.e. the solublizing ligand or the metal-binding ligand.

e) The term “reactant” of claims 100-101 is vague and indefinite because it is unclear if it is referring to the monomer of the method step of preparing an array of polymerization mixture or an additional reactant of claim 90.

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Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

16. Claims 1-6, 9-10, 14-19, 21-22, 40-41, 47-49, 52, and 54-58 are rejected under 35 U.S.C. 103(a) as being obvious over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, 1995, 117(23):6414-6415).

The applied reference has a common inventor, i.e. Johannes A. M. van Beek, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in

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the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(l)(1) and § 706.02(l)(2).

The instant claim 1 briefly recites a process for preparing and screening an array of metal-ligand compositions. The method comprises the steps of 1) preparing an array of metal-ligand compositions by reacting a metal-binding ligand and a dissolved soluble metal precursor to form the metal-ligand composition; 2) preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions; 3) subjecting the array of polymerization mixtures to conditions conducive to the formation of a polymerization reaction product; and 4) screening the array for a polymerization reaction product. The process occurs in a plurality of discrete reaction vessels contained by or within an integrated structure, and the plurality of reaction vessels of the array contains different metal-ligand compositions.

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The soluble metal precursor comprises a solublizing ligand and one or more metal-ligand compositions are formed without displacing the solublizing ligand.

Steps 2-4 is interpreted as the method of screening for the activity of the array of metal-ligand compositions via the polymerization reaction, i.e. the polymerization reaction product relates with the activity of the metal-ligand compositions.

Weinberg et al. teach the methods for the synthesis and characterization of arrays, i.e. libraries of catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein the step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15). The array comprises different metal-ligand compounds at known location and the synthesis can be conducted using solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and claim 3) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col. 11, line 12; fig. 14). The synthesis also includes adding an activator such as $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$ (refers to claims 14-15, 47-49) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to claim 9) (see e.g. col. 11, lines 13-17; col. 24, lines 46-48). The metal-binding ligand includes ligands such as heterocyclic compounds (refers to claim 2) and ancillary ligands (refers to 16-19) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61). Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10).

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The method of Weinberg et al. does not expressly include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction.

Johnson et al. disclose the methods of using soluble transition metal-based catalysts for polymerization of ethylene and α -olefins (see e.g. pg. 6414, left col., lines 1-7; pg. 6414, Scheme 1). The transition metal is palladium and nickel (refers to claim 9) (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). The solublizing ligand is methyl and Br (refers to claims 10, 22, 40-41) (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). The metal-binding ligand is diimine ligands (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). Johnson et al. disclose two synthetic schemes for the polymerization of ethylene (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). In the first synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and methyl groups, is activated with an activator that result in a loss of a methane (refers to displacing the solublizing ligand) and forming a diethyl ether adduct, and exposing the metal adduct to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., lines 15-29; pg. 6414, Scheme 1; pg. 6415, Table 1). In the second synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and bromine groups, is activated with an activator (refers to without displacing the solublizing ligand) and exposing the metal catalyst to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1; pg. 6415, Table 1).

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It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction as taught by Johnson et al. in the method of Weinberg et al. One of ordinary skill in the art would have been motivated to include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction in the method of Weinberg et al. since both Weinberg et al. and Johnson et al. disclose the method of making diimine Ni and Pd complexes, i.e. analogous art, (Weinberg: col. 12, line 65 to col. 13, line 11; Johnson: pg. 6414, left col., lines 1-18). Furthermore, one of ordinary skill in the art would have reasonably expectation of success in the combination of Weinberg et al. and Johnson et al. because Johnson et al. shown the successful polymerization of ethylene using the soluble metal catalyst.

17. Claims 70-71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, **1995**, 117(23):6414-6415) as applied to claims 1-6, 9-10, 14-19, 21-22, 40-41, 47-49, 52, and 54-58 above, and further in view of Murata et al. (US Patent 5,892,075).

The instant claim 1 briefly recites a process for preparing and screening an array of metal-ligand compositions. The method comprises the steps of 1) preparing an array of metal-ligand compositions by reacting a metal-binding ligand and a dissolved soluble metal precursor to form the metal-ligand composition; 2) preparing an array of polymerization mixtures by

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delivering a polymerization monomer to the metal-ligand compositions; 3) subjecting the array of polymerization mixtures to conditions conducive to the formation of a polymerization reaction product; and 4) screening the array for a polymerization reaction product. The process occurs in a plurality of discrete reaction vessels contained by or within an integrated structure, and the plurality of reaction vessels of the array contains different metal-ligand compositions. The soluble metal precursor comprises a solublizing ligand and one or more metal-ligand compositions are formed without displacing the solublizing ligand.

Steps 2-4 is interpreted as the method of screening for the activity of the array of metal-ligand compositions via the polymerization reaction, i.e. the polymerization reaction product relates with the activity of the metal-ligand compositions.

Weinberg et al. teach the methods for the synthesis and characterization of arrays, i.e. libraries of catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein the step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15). The array comprises different metal-ligand compounds at known location and the synthesis can be conducted using solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and claim 3) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col.11, line 12; fig. 14). The synthesis also includes adding an activator such as $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$ (refers to claims 14-15, 47-49) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to claim 9)(see e.g. col.

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11, lines 13-17; col. 24, lines 46-48). The metal-binding ligand includes ligands such as heterocyclic compounds (refers to claim 2) and ancillary ligands (refers to 16-19) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61).

Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10).

Johnson et al. disclose the methods of using soluble transition metal-based catalysts for polymerization of ethylene and α -olefins (see e.g. pg. 6414, left col., lines 1-7; pg. 6414, Scheme 1). The transition metal is palladium and nickel (refers to claim 9) (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). The solublizing ligand is methyl and Br (refers to claims 10, 22, 40-41) (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). The metal-binding ligand is diimine ligands (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). Johnson et al. disclose two synthetic schemes for the polymerization of ethylene (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). In the first synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and methyl groups, is activated with an activator that result in a loss of a methane (refers to displacing the solublizing ligand) and forming a diethyl ether adduct, and exposing the metal adduct to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., lines 15-29; pg. 6414, Scheme 1; pg. 6415, Table 1). In the second synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and bromine groups, is activated with an activator (refers to without displacing the solublizing ligand) and exposing the metal catalyst to ethylene (refers to a monomer) that result in a polymer, and the

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polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1; pg. 6415, Table 1).

The method combination of Weinberg et al. and Johnson et al. disclose the method of making and screening an array of metal-ligand compositions. However, neither Weinberg et al. nor Johnson et al. expressly include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi.

Murata et al. disclose a process for synthesizing metallocene compounds (see e.g. Abstract; col. 3, lines 7-14). The metal includes Hf(IV) (see e.g. col. 10, lines 23-38). The synthetic method of the metal compound comprise of the addition of the deprotonating agent, which is n-BuLi (see e.g. col. 11, lines 31-40).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi as taught by Murata et al. in the method combination of Weinberg et al. and Johnson et al. One of ordinary skill in the art would have been motivated to include the addition of a deprotonating agent in the method of synthesizing the metal ligand compound and the deprotonating agent is BuLi in the method combination of Weinberg et al. and Johnson et al. for the advantage of providing an efficient synthesis of metallocene compounds (Murata: col. 5, lines 48-56). Furthermore, one of ordinary skill in the art would have reasonably expectation of success in the combination of Weinberg et al., Johnson et al., and Murata et al. because Murata et al. disclose by examples the synthesis of

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metallocene compounds with the addition of the deprotonating agent (see e.g. col. 12, line 35 to col. 21, line 49).

18. Claims 90-95, 98-103, 106-107, 113-114, 116-119, and 122 are rejected under 35 U.S.C. 103(a) as being obvious over Weinberg et al. (US Patent 6,030,917) and Johnson et al. (*J. Am. Chem. Soc.*, **1995**, 117(23):6414-6415).

The applied reference has a common inventor, i.e. Johannes A. M. van Beek, with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention "by another"; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). For applications filed on or after November 29, 1999, this rejection might also be overcome by showing that the subject matter of the reference and the claimed invention were, at the time the invention was made, owned by the same person or subject to an obligation of assignment to the same person. See MPEP § 706.02(1)(1) and § 706.02(1)(2).

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The instant claim 90 briefly recites a process for preparing and screening an array of metal-ligand compositions. The method comprises the steps of 1) preparing an array of metal-ligand compositions by reacting a metal-binding ligand and a dissolved soluble metal precursor to form the metal-ligand composition; 2) preparing an array of polymerization mixtures by delivering a polymerization monomer to the metal-ligand compositions; 3) subjecting the array of polymerization mixtures to conditions conducive to the formation of a polymerization reaction product; and 4) screening the array for a polymerization reaction product. The process occurs in a plurality of discrete reaction vessels contained by or within an integrated structure, and the plurality of reaction vessels of the array contains different metal-ligand compositions. The soluble metal precursor comprises a solublizing ligand. The formation of one or more metal-ligand compositions is accompanied by the displacement the solublizing ligand, wherein the displaced solublizing ligands are converted to a form that does not significantly inhibit the polymerization reaction prior to the subjecting step.

Steps 2-4 is interpreted as the method of screening for the activity of the array of metal-ligand compositions via the polymerization reaction, i.e. the polymerization reaction product relates with the activity of the metal-ligand compositions.

Weinberg et al. teach the methods for the synthesis and characterization of arrays, i.e. libraries of catalysts and organometallic compounds (see e.g. Abstract; col. 1, lines 16-25; col. 3, lines 30-36). Weinberg et al. disclose a method of making an array of metal-ligand compounds wherein the step comprises reacting a metal binding ligand with a metal ion (refers to the metal precursor) (see e.g. col. 3, lines 37-54; col. 9, line 45 to col. 10, line 15). The array comprises

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different metal-ligand compounds at known location and the synthesis can be conducted using solution-phase synthetic technique (refers to the limitation of a plurality of discrete reaction vessels contained by integrated structure and contain different metal-ligand compounds, and claim 3) (see e.g. col. 3, lines 55-64; col. 10, line 66 to col.11, line 12; fig. 14). The synthesis also includes adding an activator such as $\text{PhNMe}_2\text{HB}(\text{C}_6\text{F}_5)_4$ (refers to claim 114) (see e.g. col. 11, lines 28-37). The metal ion is transition metal ions (refers to claim 98)(see e.g. col. 11, lines 13-17; col. 24, lines 46-48). The metal-binding ligand includes ligands such as heterocyclic compounds and ancillary ligands (refers to 102-103) (see e.g. col. 15, line 61 to col. 16, line 11; col. 16, lines 20-34; col. 16, line 35 to col. 21, line 61). Additionally, the libraries are screened for useful property such as polymerization reaction (see e.g. col. 11, lines 38-67; col. 26, line 63 to col. 27, line 10).

The method of Weinberg et al. does not expressly include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction.

Johnson et al. disclose the methods of using soluble transition metal-based catalysts for polymerization of ethylene and α -olefins (see e.g. pg. 6414, left col., lines 1-7; pg. 6414, Scheme 1). The transition metal is palladium and nickel (refers to claim 98) (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). The solublizing ligand is methyl and Br (refers to claims 10, 22, 40-41) (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). The metal-binding ligand is diimine ligands (see e.g. pg. 6414, left col., lines 15-24; pg. 6414, Scheme 1). Johnson et al. disclose two synthetic schemes for the polymerization of ethylene (see e.g. pg. 6414, left

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col., lines 15-24; pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1). In the first synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and methyl groups, is activated with an activator that result in a loss of a methane (refers to displacing the solublizing ligand) and forming a diethyl ether adduct, and exposing the metal adduct to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, left col., lines 15-29; pg. 6414, Scheme 1; pg. 6415, Table 1). In the second synthetic scheme the metal catalyst, i.e. the metal with diimine ligands and bromine groups, is activated with an activator (refers to without displacing the solublizing ligand) and exposing the metal catalyst to ethylene (refers to a monomer) that result in a polymer, and the polymer is analyzed by NMR, i.e. nuclear magnetic resonance, (see e.g. pg. 6414, right col., lines 1-4; pg. 6414, Scheme 1; pg. 6415, Table 1).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction as taught by Johnson et al. in the method of Weinberg et al. One of ordinary skill in the art would have been motivated to include a soluble metal precursor comprising a solublizing ligand, and the method of screening the metal-ligand composition for activity by way of polymerization reaction in the method of Weinberg et al. since both Weinberg et al. and Johnson et al. disclose the method of making diimine Ni and pd complexes, i.e. analogous art, (Weinberg: col. 12, line 65 to col. 13, line 11; Johnson: pg. 6414, left col., lines 1-18). Furthermore, one of ordinary skill in the art would have reasonably expectation of success in the combination of Weinberg et al.

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and Johnson et al. because Johnson et al. shown the successful polymerization of ethylene using the soluble metal catalyst.

Withdrawn Rejections

19. The rejection of claims 1, 3, 54-57, and 72 under 35 USC 102(b) as being anticipated by President and Fellows of Harvard College (WO 98/12,156) has been withdrawn in view of applicant's amendments of claim 1 and cancellation of claim 72.

20. The rejection of claims 1-6, 10-19, 22, 47-49, 52, 54-57, and 72 under 35 USC 102(e) as being anticipated by Weinberg et al. (US Patent 6,030,917) has been withdrawn in view of applicant's amendments of claim 1 and cancellation of claim 72.

21. The rejection of claims 1-6, 9-19, 21-22, 40-41, 47-49, 52, 54-58, 69, and 72 under 35 USC 103(a) as being obvious over President and Fellows of Harvard College (WO 98/12,156) (Note: refers as 'Harvard College') and Fujita et al. (US Patent 6,309,997 B1) has been withdrawn in view of applicant's amendments of claim 1.

22. The rejection of claims 1-6, 9-19, 21-22, 40-41, 47-49, 52, 54-58, 69, 70-71, and 72 under 35 USC 103(a) as being obvious over President and Fellows of Harvard College (WO 98/12,156) (Note: refers as 'Harvard College') and Fujita et al. (US Patent 6,309,997 B1) and

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further in view of Murata et al. (US Patent 5,892,075) has been withdrawn in view of applicant's amendments of claim 1.

Response to Arguments

23. Applicant's arguments with respect to claims 1-6, 9-19, 21-22, 40-41, 47-49, 52, 54-58, 69, and 70-72 have been considered but are moot in view of the new grounds of rejection.

Conclusion

24. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to MY-CHAU T TRAN whose telephone number is 571-272-0810.


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The examiner can normally be reached on Mon.: 8:00-2:30; Tues.-Thurs.: 7:30-5:00; Fri.: 8:00-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, ANDREW WANG can be reached on 571-272-0811. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mct
August 22, 2004



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